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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/817,592	HARTKOP ET AL.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-52 and 57-81* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-52 and 57-81* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. In view of the appeal brief filed on January 23, 2009, PROSECUTION IS HEREBY REOPENED. The new grounds of rejection based on new found art are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/Stephone B. Allen/
Supervisory Patent Examiner, Art Unit 2872

Remark

- Claims 1-52 and 57-81 remain pending in this application.

Claim Objections

2. Claims 1-52 and 57-81 are objected to because of the following informalities:

(1). The **amended** phrase "the open apertures scan the aperture plate (or the flat screen Ferroelectric LCD dynamic parallax barrier) in two dimensional movements to generate illusion that the opaque areas are transparent" recited in **amended** claims 1, 21, 42, 57, 68 and 76 is confusing. Perhaps it is better to state as "the apertures are sequentially open to form scanning apertures across the aperture plate (or the flat screen Ferroelectric LCD parallax barrier) to generate illusion that the opaque areas are also transparent".

(2) The aperture plate may have apertures on the plates but will not "produce" slit apertures. The amended term **"capable of"** recited in claim 5 is confusing and indefinite since it is not clear if the phrase after the term is or is not part of the claim. **The applicant is respectfully noted that the recitation regarding the ability of the element is not part of positive limitations of the claims. The phrase is better stated as "apertures of said aperture plate form vertical slit aperture openings each having a slit width".**

(3). The phrase "capable of" recited in various claims is confusing and indefinite. It has been held the recitation that an element is "capable of" performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. In re Hutchison, 69 USPQ 138.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 21, 24, 26, 27-30, 31, 34-36, 38 and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by patent issued to Hirimai (PN. 7,445,733).

Hirimai teaches a *three dimensional display device* that is comprised of *liquid crystal display screen* (70, Figure 24) having pixels and a pixel width, and a pinhole liquid crystal display panel (71) serves as the *aperture plate* including *apertures and opaque areas* formed by optically opening and closing cell array wherein the pinhole liquid crystal display panel is disposed in front of the LCD display screen, (please see Figure 24). Hirimai teaches that the pinhole liquid crystal display panel is configured to sequentially opening and closing the cell such that the open apertures scan the pinhole liquid crystal display panel or aperture plate in both X and Y directions or in two dimensional movements to generate the illusion that the opaque areas are transparent. Hirimai teaches that the two dimensional image displayed on the LCD screen (70) is representing a three dimensional image to be displayed as a whole or in part from view points different from each other, this means the two dimensional image displayed on the LCD screen is comprised of multiple different perspectives of a scene that forms a perceived 3D images. Hirimai teaches that the a control is performed such that the image forming area on the LCD display screen are shifted in synchronism with the scan of the opening/closing of the cell array so that it allows simultaneously viewing of the image from respective multiple different user viewing angles, (please see column 23, line 15 to column 24 line 23).

Hirimai teaches that a gap such as an air gap with a distance is set between the LCD display screen and the aperture plate or pinhole LCD panel, (please see Figure 24).

It is understood in the art that in order to allow the "open apertures scan the aperture plate in two dimensional movements to generated illusion that that opaque areas are transparent", the opening and closing of the cell array is *sufficiently fast* over (or scans over) the screen so that the movement of the open aperture is *no longer resolved* (i.e. the illusion that the opaque areas are also transparent) by an observer.

The two dimensional movement of the opening/closing of the cell array allows both vertical and horizontal parallax.

With regard to claim 24, Hirimai teaches an air gap is set between the display screen and the aperture plate or the pinhole LCD panel.

With regard to claim 26, Hirimai teaches that the display screen (70) is dimensionally larger than the aperture plate (71, Figure 24).

With regard to claims 27-30, Hirimai teaches that the opening/closing of the cell array scans in both X and Y direction or in a two dimensional movement, this means it is implicitly true that the horizontal viewing angle range is at least in the range of 10 to 30 degree from normal, and the vertical viewing angle range is at least in range of 5 to 25 degrees from normal. The horizontal and vertical parallax have angle range up to 180 degrees.

With regard to claims 31 and 35, Hirimai teaches that the display screen is a liquid crystal display panel that is considered to be high frame rate video display device, (since the claim fails to define what is considered to be "high" frame rate).

With regard to claim 34, the pinhole liquid crystal display panel taught by Hirimai is a high speed optical shuttering system, (since the optical opening/closing cell makes it a shuttering system, also the claim fails to disclose what is considered to be "high" speed).

With regard to claim 36, the display screen is a rear projection display device, (please see Figure 24).

With regard to claims 38 and 39, the pinhole liquid crystal display panel taught by Hirimai is a solid state scan type, (since the claim fails to define what is considered to be "solid state" type, the liquid crystal based aperture plate can be regarded as solid state type). The scanning is a flat scanner.

This reference has therefore anticipated the claims.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3, 5, 8-9, 13-18, 68, 72-75 and 76-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirimai (PN. 7,446,733).

Hirimai teaches a *three dimensional display device* that is comprised of *liquid crystal display screen* (70, Figure 24) having pixels and a pixel width, and a pinhole liquid crystal display panel (71) serves as the *aperture plate* including *apertures and opaque areas* formed by optically opening and closing cell array wherein the pinhole liquid crystal display panel is disposed in front of the LCD display screen, (please see Figure 24). Hirimai teaches that the pinhole liquid crystal display panel is configured to sequentially opening and closing the cell such that the open apertures scan the pinhole liquid crystal display panel or aperture plate in both X and Y directions or in two dimensional movements to generate the illusion that the opaque areas are transparent. Hirimai teaches that the two dimensional image displayed on the LCD screen (70) is representing a three dimensional image to be displayed as a whole or in part from view points different from each other, this means the two dimensional image displayed on the

LCD screen is comprised of multiple different perspectives of a scene that forms a perceived 3D images. Hirimai teaches that the a control is performed such that the image forming area on the LCD display screen are shifted in synchronism with the scan of the opening/closing of the cell array so that it allows simultaneously viewing of the image from respective multiple different user viewing angles.

Hirimai teaches that a gap such as an air gap is set between the LCD display screen and the aperture plate or pinhole LCD panel, (please see Figure 24). Hirimai however does not teach explicitly about the separation distance to be in the claimed range. However such gap distance is considered to be obvious matters of design choice to one skilled in the art to allow the proper alignment and focusing of the image light from each pixels to pass through the apertures to enable proper viewing of the three dimensional image, (please see column 3, line 46 to column 4 line 67).

It is understood in the art that in order to allow the "open apertures scan the aperture plate in two dimensional movements to generated illusion that that opaque areas are transparent", the opening and closing of the cell array is *sufficiently fast* over (or scans over) the screen so that the movement of the open aperture is *no longer resolved* (i.e. the illusion that the opaque areas are also transparent) by an observer.

With regard to independent claim 68, Hirimai teaches that the display screen can be a LCD panels, which is a flat panel, and the aperture plate is comprised of a pinhole liquid crystal display device, which is also has a flat panel. Hirimai teaches that there is a gap separation, d, (Figure 24), between the display screen and the aperture plate. Hirimai however does not teach explicitly about the separation distance to be in the claimed range. However such gap distance is considered to be obvious matters of design choice to one skilled in the art to allow the proper alignment and focusing of the image light from each pixels to pass through the apertures to enable proper viewing of the three dimensional image.

With regard to independent claim 76, Hirimai teaches that the display screen can be a LCD panels, which is a flat panel, and the aperture plate is comprised of a pinhole liquid crystal display device,

which is also has a flat panel. Hirimai teaches that there is a gap separation, d, (Figure 24), between the display screen and the aperture plate. Hirimai however does not teach explicitly about the separation distance to be in the claimed range. However such gap distance is considered to be obvious matters of design choice to one skilled in the art to allow the proper alignment and focusing of the image light from each pixels to pass through the apertures to enable proper viewing of the three dimensional image. This reference also does not teach explicitly that the display screen is a hybrid screen. But it is not clear what does it mean by a "hybrid screen" such feature is met by the same way as the instant application with regarding to the LCD display screen.

With regard to claim 2, Hirimai teaches that the display of portion of the two dimensional image is controlled so that it is synchronized with the opening of the apertures (as shown in Figure 24).

With regard to claim 3, Hirimai teaches an air gap is between the display screen (70, Figure 24) and aperture plate (71).

With regard to claim 5, Hirimai teaches that the aperture has a finite width that implicitly makes it a slit with certain vertical dimension.

With regard to claim 8, Hirimai teaches the aperture plate has predetermined number of apertures and the number of apertures is less that the number of the pixels.

With regard to claim 9, Hirimai teaches that the aperture plate is comprised of a liquid crystal display that implicitly include active regions for form the apertures.

With regard to claim 13, the pinhole liquid crystal display panel taught by Hirimai is a high speed optical shuttering system, (since the optical opening/closing cell makes it a shuttering system, also the claim fails to disclose what is considered to be “high” speed).

With regard to claim 14, Hirimai teaches that the display screen could be a liquid crystal display (LCD, please see column 13, line 31).

With regard to claims 15-16, and 77, the display is a rear projection display device, (please see Figure 24). This reference does not teach the display is either a high speed projector or a DLP, however since both display devices are well known in the art it would have been obvious to one skilled in the art to utilize either one of the display for the benefit of making them also capable of providing three-dimensional image display. With **regard to claim 77**, it is an obvious modification to one skilled in the art to include a video projector with the display screen to provide the image information for displaying.

With regard to claims 17-18, the pinhole liquid crystal display panel taught by Hirimai is a solid state scan type, (since the claim fails to define what is considered to be "solid state" type, the liquid crystal based aperture plate can be regarded as solid state type). The scanning is flat scanner.

With regard to claims 23, and 43, Just et al teaches that there is a gap separation, d, (Figure 9), between the display screen and the aperture plate. Just teaches that for certain design the gap distance can be 3.5 cm, (please see column 12,line 43), which is between 0.1 cm and 5 cm.

With regard to claim 26, Just et al teaches that the physician dimension of the aperture plate can be smaller than the physical dimension of the screen, (please see Figure 9 and column 12 for the design specifics).

With regard to claims 72-75 and 78-81, Hirimai teaches that the opening/closing of the cell array scans in both X and Y direction or in a two dimensional movement, this means it is implicitly true that the horizontal viewing angle range is at least in the range of 10 to 30 degree or 20 to 60 degrees from normal, and the vertical viewing angle range is at least in range of 5 to 25 or 10 to 50 degrees from normal. The horizontal and vertical parallax have angle range up to 180 degrees.

7. Claims 4, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Hirimai as applied to claim 1 above, and further in view of the patent issued to Taniguchi et al (PN. 6,094,216).

The three dimensional image display device taught by Hirimai as described for claim 1 above has met all the limitations of the claims.

With regard to claim 4, Hirimai teaches that the aperture plate and the display screen is separated with an air gap of finite distance "d". However it does not teach explicitly if the gap is formed as a solid gap. **Taniguchi** et al in the same field of endeavor teaches a aperture plate disposed in front of a display screen wherein the gap between the aperture plate and the display screen can be either formed as air gap, (please see Figure 9) or solid spacer (102, Figure 34, column 1, line 45). It would then have been obvious to one skilled in the art to apply the teachings of Taniguchi et al to replace the air gap with a solid spacer to facilitate the separation between the aperture plate and the display screen.

With regard to claim 19, Hirimai teaches that the display screen could be a liquid crystal display but it does not teach explicitly that it is a ferroelectric liquid crystal display device. **Taniguchi** et al in the same field of endeavor teaches that a ferroelectric liquid crystal display device is a well known display device, (please see column 7, line 51). It would then have been obvious to one skilled in the art to apply the teachings of Taniguchi et al to use a ferroelectric liquid display device as alternative display device as an obvious matters of design choice for both LCD and ferroelectric LCD function the same as image display screen.

8. Claims 6-7, 10-12, 20, and 69-71 rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Hirimai as applied to claims 1 and 68 above, and further in view of the patent issued to Just et al (PN. 6,674,463).

The three dimensional image display device taught by Hirimai as described for claims 1 and 68 above has met all the limitations of the claims.

With regard to claims 6-7, Hirimai does not teach explicitly that the slit width of the aperture is equal or greater that the pixel width of the display screen. Just et al in the same field of endeavor teaches scanning aperture type three dimensional display device wherein the pixel width (corresponding to the width for each perspective) can be equal to the slit width, (please see column 12, lines 60-67, wherein the actual pixel width for each perspective is 0.5/12 mm and the slit width is also 0.5/12 mm). It would then have been obvious to apply the teachings of Just et al to modify the display device of Hirimai to facilitate the three dimensional display device to allow the proper three dimensional image be viewed. Although this reference does not teach explicitly the slit width may also be greater than the pixel width, such modification is considered to be obvious matters of design choice to one skilled in the art since it achieves the same three dimensional image display.

With regard to claims 10-12, 20 and 69-71, Hirimai does not teach explicitly about the frame rate of the display screen to be exceed 150 frames per second. It also does not teach explicitly about resolution to allow 8 different perspective views. **Just** et al teaches that the image display fresh rate is determined by the multiplication of the standard flicker free rate (50 to 70 Hz) and the number of the required perspective views, (please See column 3, lines 46-52), which is well above 150 Hz (or frames per second). Just et al also teaches the frame rate is several thousands hertz which is less than 20,000 Hz or frames per second. Just et al teaches that it is possible to have one perspective per one degrees of viewing angle which is more that 8 different perspectives. Just et al teaches that for a typical notebook computer, the number of perspectives is 12, (please see column 12, lines 60-67). Since the moving of the aperture is synchronized with the displaying or fresh rate of the display screen, the aperture plate is also a high speed shuttering system. Furthermore, **Just** et al teaches that the aperture plate is a ferroelectric liquid crystal display which is a high speed shuttering system, (with regard to claims 20 and 69). It

would then have been obvious to apply the teachings of Just et al to modify the display device to Hirimai to make the three dimensional display device works more efficiently.

9. Claims 22, 23, 37 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Hirimai.

The three dimensional image display device taught by Hirimai as described for claim 21 above has met all the limitations of the claims.

With regard to claim 22, this reference does not teach explicitly that the aperture size is not smaller than the pixel size. However such feature is considered to be obvious smatters of design choice to one skilled in the art to allow the aperture properly presenting the image portion to the eye for viewing.

With regard to claim 23, Hirimai teaches that the a gap such as an air gap is set between the LCD display screen and the aperture plate or pinhole LCD panel, (please see Figure 24). Hirimai however does not teach explicitly about the separation distance to be in the claimed range. However such gap distance is considered to be obvious matters of design choice to one skilled in the art to allow the proper alignment and focusing of the image light from each pixels to pass through the apertures to enable proper viewing of the three dimensional image, (please see column 3, line 46 to column 4 line 67).

With regard to claim 37, this reference does not teach the display is either a high speed projector or a DLP, however since both display devices are well known in the art it would have been obvious to one skilled in the art to utilize either one of the display for the benefit of making them also capable of providing three-dimensional image display.

With regard to claim 41, this reference does not teach explicitly that the number of viewing angles for the vertical viewing is less than the number of viewing angles of the vertical viewing. However since Hirimai teaches that the aperture plate has aperture scanning in two dimensional

movement the same way as the instant application, it should have the same number limitations of angle views in horizontal and vertical as the instant application.

10. **Claims 25 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Hirimai and in view of the patent issued to Taniguchi et al (PN. 6,094,216).**

The three dimensional image display device taught by Hirimai as described for claim 21 above has met all the limitations of the claims.

With regard to claim 25, Hirimai teaches that the aperture plate and the display screen is separated with an air gap of finite distance "d". However it does not teach explicitly if the gap is formed as a solid gap. **Taniguchi** et al in the same field of endeavor teaches a aperture plate disposed in front of a display screen wherein the gap between the aperture plate and the display screen can be either formed as air gap, (please see Figure 9) or solid spacer (102, Figure 34, column 1, line 45). It would then have been obvious to one skilled in the art to apply the teachings of Taniguchi et al to replace the air gap with a solid spacer to facilitate the separation between the aperture plate and the display screen.

With regard to claim 35, Hirimai teaches that the display screen could be a liquid crystal display but it does not teach explicitly that it is a ferroelectric liquid crystal display device. **Taniguchi** et al in the same field of endeavor teaches that a ferroelectric liquid crystal display device is a well known display device, (please see column 7, line 51). It would then have been obvious to one skilled in the art to apply the teachings of Taniguchi et al to use a ferroelectric liquid display device as alternative display device as an obvious matters of design choice for both LCD and ferroelectric LCD function the same as image display screen.

11. Claims 32 and 40 rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Hirimai in view of the patent issued to Just et al (PN. 6,674,463).

The three dimensional image display device taught by Hirimai as described for claim 21 above has met all the limitations of the claims.

With regard to claims 32 and 40, Hirimai does not teach explicitly about the frame rate of the display screen to be exceed 150 frames per second. **Just** et al teaches that the image display fresh rate is determined by the multiplication of the standard flicker free rate (50 to 70 Hz) and the number of the required perspective views, (please See column 3, lines 46-52), which is well above 150 Hz (or frames per second). Since the moving of the aperture is synchronized with the displaying or fresh rate of the display screen, the aperture plate is also a high speed shuttering system. Furthermore, **Just** et al teaches that the aperture plate is a ferroelectric liquid crystal display which is a high speed shuttering system, (with regard to claims 20 and 69). It would then have been obvious to apply the teachings of Just et al to modify the display device to Hirimai to make the three dimensional display device works more efficiently.

12. Claims 42-44, 49-52, and 57-60, and 64-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Hirimai in view of the patent issued to Taniguchi et al.

Hirimai teaches, (**with regard to claims 42 and 57),** a *three dimensional display device* that is comprised of *liquid crystal display screen* (70, Figure 24) having pixels and a pixel width, serves ass the display matrix, and a pinhole liquid crystal display panel (71) serves as the *dynamical parallax barrier,* including *apertures and opaque areas* formed by optically opening and closing cell array wherein the pinhole liquid crystal display panel is disposed in front of the LCD display screen, (please see Figure 24). Hirimai teaches that the pinhole liquid crystal display panel is configured to sequentially opening and closing the cell such that the open apertures scan the pinhole liquid crystal display panel or aperture plate in both X and Y directions or in two dimensional movements to generate the illusion that the opaque areas are transparent. Hirimai teaches that the two dimensional image displayed on the LCD screen (70) is

representing a three dimensional image to be displayed as a whole or in part from view points different from each other, this means the two dimensional image displayed on the LCD screen is comprised of multiple different perspectives of a scene that forms a perceived 3D images. Hirimai teaches that the a control is performed such that the image forming area on the LCD display screen are shifted in synchronism with the scan of the opening/closing of the cell array so that it allows simultaneously viewing of the image from respective multiple different user viewing angles, (please see column 23, line 15 to column 24 line 23).

Hirimai teaches that a gap such as an air gap with a distance is set between the LCD display screen and the aperture plate or pinhole LCD panel, (please see Figure 24).

It is understood in the art that in order to allow the "open apertures scan the aperture plate in two dimensional movements to generated illusion that that opaque areas are transparent", the opening and closing of the cell array is *sufficiently fast* over (or scans over) the screen so that the movement of the open aperture is *no longer resolved* (i.e. the illusion that the opaque areas are also transparent) by an observer. The two dimensional movement of the opening/closing of the cell array allows both vertical and horizontal parallax.

This reference has met all the limitations of the claims with the exception that it does teach explicitly that the display matrix and the dynamic parallax barrier are formed at the opposite surface of a substrate. **Taniguchi** et al in the same field of endeavor teaches a parallax barrier (103, Figure 34) and a display screen (101) is placed at opposite side a substrate (102) serves as the spacer between the two. It would then have been obvious to one skilled in the art to apply the teachings of Taniguchi et al to modify the device of Hirimai to make the display screen and the aperture or parallax barrier plate at opposite side of the substrate for the benefit of using the substrate as the spacer to provide the required spatial separation between the two.

With regard to claims 43 and 58, **Hirimai** teaches that the a gap such as an air gap is set between the LCD display screen and the aperture plate or pinhole LCD panel, (please see Figure 24). Hirimai however does not teach explicitly about the separation distance to be in the claimed range. However such gap distance is considered to be obvious matters of design choice to one skilled in the art to allow the proper alignment and focusing of the image light from each pixels to pass through the apertures to enable proper viewing of the three dimensional image, (please see column 3, line 46 to column 4 line 67).

With regard to claims 44 and 59, this reference does not teach explicitly that the aperture size is not smaller than the pixel size. However such feature is considered to be obvious smatters of design choice to one skilled in the art to allow the aperture properly presenting the image portion to the eye for viewing.

With regard to claims 45 and 60, Hirimai teaches that the display screen is a liquid crystal display screen, but it does not teach explicitly that it is a ferroelectric liquid crystal display device. **Taniguchi** et al in the same field of endeavor teaches that a color ferroelectric liquid crystal display device is a well known display device, (please see column 7, line 51). It would then have been obvious to one skilled in the art to apply the teachings of Taniguchi et al to use a ferroelectric liquid display device as alternative display device as an obvious matters of design choice for both LCD and ferroelectric LCD function the same as image display screen.

With regard to claims 49-52, and 64-67, Hirimai teaches that the opening/closing of the cell array scans in both X and Y direction or in a two dimensional movement, this means it is implicitly true that the horizontal viewing angle range is at least in the range of 10 to 30 degree or 20 to 60 degrees from normal, and the vertical viewing angle range is at least in range of 5 to 25 or 10 to 50 degrees from normal. The horizontal and vertical parallax have angle range up to 180 degrees.

13. Claims 46-48 and 61-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Hirimai and Taniguchi as applied to claims 42 and 57 above, and further in view of the patent issued to Just et al.

The three dimensional display device taught by Hirimai in combination with the teachings of Taniguchi as described for claims 42 and 57 above have met all the limitations of the claims.

With regard to claims 46 and 61, Hirimai teaches that the dynamical parallax barrier is a liquid crystal display panel but it does not teach explicitly that it is a FLCD device. **Just** et al teaches a scanning aperture three dimensional display device wherein the dynamical parallax is formed by a ferro-electric liquid crystal display device, (please see column 16, lines 7-10). It would then have been obvious to one skilled in the art to apply the teachings of Just et al to make the dynamic parallax barrier with a Ferro-electric liquid crystal display device as an alternative display for achieving the same parallax barrier function.

With regard to claims 62-63, Hirimai does not teach explicitly that the frame rate of the display panel. **Just** et al teaches that the image display fresh rate is determined by the multiplication of the standard flicker free rate (50 to 70 Hz) and the number of the required perspective views, (please See column 3, lines 46-52), which is well above 150 Hz (or frames per second). Just et al also teaches the frame rate is several thousands hertz which is less than 20,000 Hz or frames per second. It would then have been obvious to one skilled in the art to modify the frame rate of the display panel for he benefit of enhancing the three dimensional image display.

Response to Arguments

14. Applicant's arguments with respect to claims 1-52 and 57-81 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (9:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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